

Enhancing EMR Clinical Value through a Standards-Enabled EMR Maturity Model

Panel Discussion
eHealth Vancouver
June 2, 2014

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Measuring EMR Adoption

PURPOSE:

- To assess utilization and maturity of ICT in clinical practice environments
- To assess the contribution of electronic records to improving health care delivery

Three Primary Measures

<p>Uptake (deployment, breadth) - percentage of the intended user base that have implemented the system) (easy to measure)</p>	<p>Functionality (what it does and how well it meets the needs of the clinical practice environment for which it was intended (harder to measure)</p>	<p>Outcomes (improvements in health, clinical value, care processes and safety and the reduction of mortality and morbidity measured against initial baseline values (hardest to measure)</p>
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Adapted from: COACH EMR Adoption & Maturity Model 2013

Speaker focus

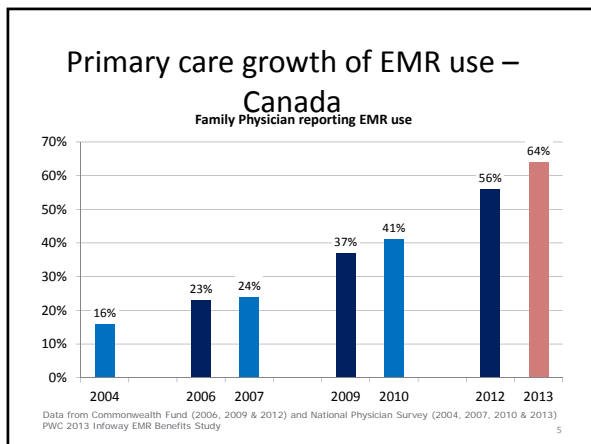
- How to increase the value of EMRs for physician adopters by:
 - Applying a maturity model to assess current level of EMR use and function
 - Mapping standards to work flows and the maturity model
 - Applying knowledge gained to acquire/activate advanced EMR use to improve care efficiency, productivity and outcomes
 - Identifying actions/action plan to achieve this advanced level of EMR use.

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Adoption Measure - Deployment

- Extensively studied as it is the easiest to compile data on – governments want to track their ROIs in EMRs
- Latest EMR adoption data in Canada contained in PWC EMR Benefits Evaluation Study commissioned by Canada Health Infoway; published in April 2013 – *The emerging benefits of electronic medical record use in community-based care* www.infoway-inforoute.ca.

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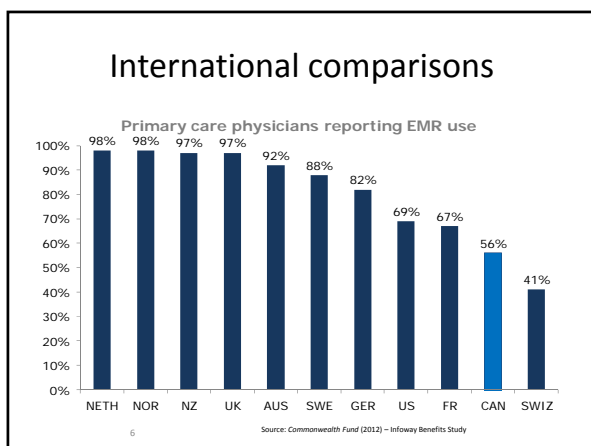


EMR Benefits realized to date

- Efficiencies in workflow as staff time is redeployed from handling paper records (reduced chart pulls by 56% in primary care) & easier/faster recording of and access to patient information
- Provider productivity impacts are harder to quantify
- Reduced numbers of duplicate tests (24% in primary care) and adverse drug events (40% in primary & specialty care)
- Improved interactions and communications among care team members and between providers and patients.

➤ **Overall = e-version of paper record/practice**

Source: The emerging benefits of electronic medical record use in community-based care, PwC, 2013



Deployment ≠ Effective Use

- Effective use is significantly lower than adoption levels and is the metric that should be more comprehensively measured e.g. use of messaging standards, e-transmission of referrals and consultations, e-chart transfers between EMR systems, e-prescribing; e-medication management.
- 64% of Canadian primary care physicians using EMRs in 2013 (Commonwealth Fund & Canadian National Physician Survey)
- It is reasonable to assume that a much smaller percentage are using their EMRs effectively.
- Similarly in the U.S., the 2009 National Ambulatory Medical Care Survey (NAMCS) indicated that just 6.3% of physicians were using fully functional EMRs although 43.9% of physicians reported using any EMR system- <http://www.backbonemag.com/Backblog/canada-vs-the-united-states-status-of-emr-adoption.aspx#sthash.IQGLD9YA.dpuf>

Advanced use of EMRs varies across Canada

3% TO 18%
OF PRIMARY CARE PHYSICIANS IN CANADA WERE ESTIMATED TO EFFECTIVELY USE EMRS TO SUPPORT IMPROVED CHRONIC DISEASE MANAGEMENT AND PREVENTIVE CARE TO IMPROVE PATIENT OUTCOMES

Source: The emerging benefits of electronic medical record use in community-based care, PwC, 2013

EMR Maturity Model

- Measures functionality (vs. deployment or outcomes)
- Portrays the advancement of maturity as users progress through the levels; supported by 7 EMR functional categories

Practice Management
Information Management
Results Management
Diagnosis Management
Treatment Planning Support
Patient Engagement & Communication
Evaluation & Monitoring

Canadian EMR Adoption and Maturity Model

Source: COACH EMR Adoption & Maturity Model – White Paper, Feb. 2013

EMR Adoption measure – functionality

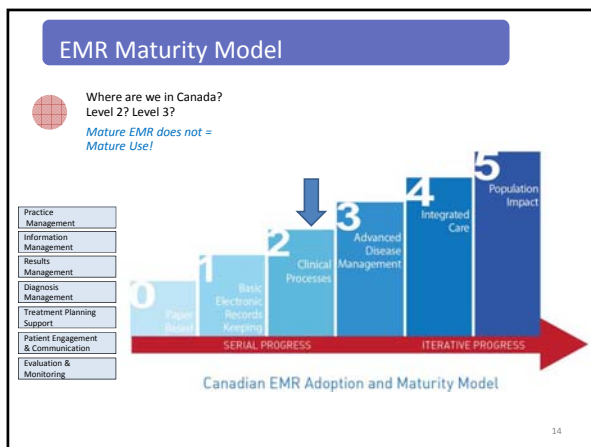
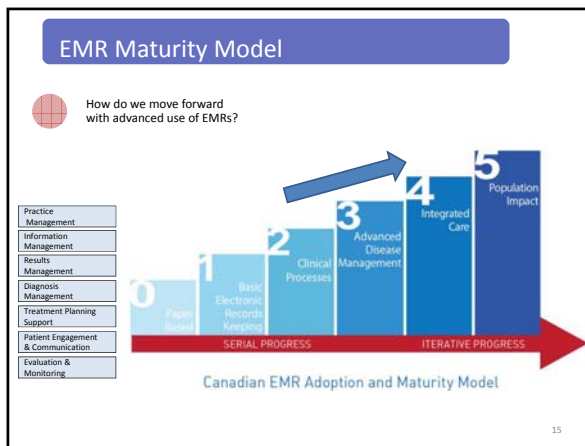
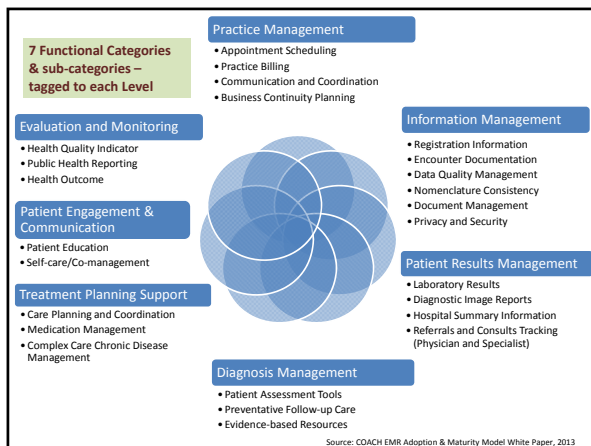
- Basis for Canadian EMR Adoption & Maturity Model
- Built on common features of several existing models (ON, AB, BC, MB, work out of U Vic)
- Consistent with characteristics of a common adoption model:
 - Comprehensive, unambiguous consistent, robust and least “game-able”
 - Enables effective survey tools and effective comparisons between organizations or between jurisdictions to demonstrate progressive clinical value along the adoption journey
 - Reusable by many organizations and jurisdictions
 - Adaptable to incorporate new and advanced care models, health care services, functionality and elements as these become available.

Adapted from COACH EMR Adoption & Maturity Model – White Paper, Feb. 2013

Maturity Model Levels - Descriptors

- Level 0 - Paper-Based** - Paper is the dominant means of storing, accessing, and exchanging information
- Level 1 Basic Electronic Record Keeping** - EMR available with basic use for practice management streamlining of foundational clinical efficiency such as encounter documentation, prescription creation and renewal, lab ordering and scanning
- Level 2 Clinical Processes** - Established clinical processes with decision-making support at the individual patient level, standardization of data coding and fully structured workflow practices.
- Level 3 Advanced Disease Management** - Enhanced delivery and support of care from automated clinical workflow and process including a focus on outcomes to manage complications and on advanced tracking for treatment adherence.
- Level 4 Integrated Care** - Supports adherence to optimal standard(s) of care1 across/between care teams (internal/external) through integration and exchange of information at the community and regional levels.
- Level 5 Population-Impact** - Profiles (based on risks or conditions) sub-populations; measures process and outcomes; provides performance feedback; supports regional health policy planning and reporting at the jurisdictional level.

Source: COACH EMR Adoption & Maturity Model – White Paper, Feb. 2013



Moving to Advanced EMR Use

- We can assume we have achieved a “critical mass” of EMR adoption/users in Canada at 65% adoption rates - up to 90% in some jurisdictions.
 - Critical mass – “the minimum amount (of something) required to start or maintain a venture” (Princeton’s Wordnet)
 - We are/should be ready to advance!
 - Physicians: We need to move forward from “stone age” EMRs - but not to the Bronze Age!
 - Vendors – We give physicians what they want/ask for.
 - Vendors - Most doctors don't even KNOW what a properly designed system could do.

Advanced EMR Use - What physicians want from their EMRs

- EMR systems that facilitate finding clinical information appropriate to the clinical context (e.g., consult notes are often long and detailed, making it hard to find a clear reply to the clinical question that prompted the referral)
- EMR adoption programs that focus on outcomes (i.e., meaningful use) as opposed to base deployment of EMRs
- EMR functionality that automates workflow and supports evaluation of office productivity
- EMR functionality that includes data analysis and business intelligence capability to provide feedback to physicians on ways they might improve their practice
- Enhanced EMR functionality and integration with other systems to support coordination of care.

Source: CMA Future Practice Article <http://viewer.zmags.com/publication/1e9582ac#1e9582ac/1>

Why standards are the elephant in the (EMR practice) room

- **Standards used for recording and exchanging information** in EMRs are poorly understood by Canadian physicians; most do not appreciate why adopting standards is so important to helping them deliver better care.
- Focus has been on deployment, deployment, deployment & automating paper records & workflow
- EMR systems in Canada have largely evolved as “add-ons” to existing billing and scheduling systems vs. UK where EMR was a clinical system from the start – UK has 100% EMR adoption & 100% data coding; problem list items are linked to labs & meds
- At the national level, Canada Health Infoway’s primary mandate has been to implement large, shared EHRs — regional or provincial databases
 - However – in infoway’s defence - they recognized that physicians want to consume data not provide data, and the latter is still the case.
 - In the past 5 years Infoway has turned its focus to EMR adoption and data from community-based physicians.

(Source: CMA Future Practice – Nov 2013 – Standards – A Call to Action
<http://viewer.zmags.com/publication/1e9582ac#1e9582ac/1>)

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Advanced EMR Use – to achieve what physicians want

- Requires:
 - ongoing maintenance of current EMR implementation programs
 - advanced EMR functionality facilitated by an EMR Adoption & Maturity Model
- Advanced EMR functionality requires knowledge, understanding and implementation of standards, in particular data standards – an area of EMR implementation success that is lagging behind in Canada and internationally.

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Current state with respect to HI standards

- **Insights and Lessons Learned From the PHC VRS Prototype** http://www.cihi.ca/CIHI-ext-portal/pdf/Internet/LESSONS_PHC_VRS_PROTO_EN
- CIHI’s Primary Health Care Voluntary Reporting System (PHC VRS) prototype was initiated in 2009 as a proof of concept to assess the potential viability of extracting and analyzing data from electronic medical record (EMR) systems in their current state in conjunction with the development of a pan-Canadian EMR Content Standard (CS).

Key Insights related to data collection in primary care:

1. PHC EMR data in its current state is non-standard, unstructured and collected mostly as free-text fields at the point of care.
2. The process of extracting, manipulating and analyzing this non-standardized EMR data is not sustainable or affordable—the predominance of free text means that cleaning and using the data is resource-intensive and introduces data quality risks.
3. Regular, systematic data collection and analysis from PHC EMR systems is neither viable nor sustainable at this time.

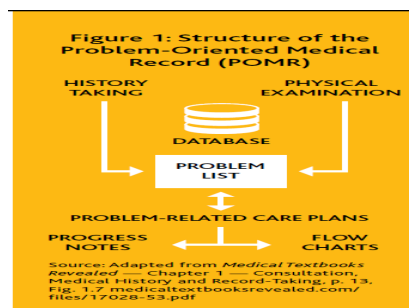
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Current state (standards) (cont'd)

- Infoway EMR benefits evaluation – 2013 (conducted by PWC) <https://www.infoway-inforoute.ca> indicates there is significant work to do in data standardization, enhancing connectivity & interoperability, population management and priority research areas
- Population health knowledge, management & research - CPCSSN (PHAC, CFPC, CIHI) <http://cpcssn.ca/> - collects primary care data and organizes and maintains a sentinel surveillance system for chronic disease contributing to knowledge about the health of Canadians and research that strengthens the study of Canadian primary health care.
 - Requires processes for the extraction, cleaning and uploading of EMR data into the central data repository as well as query/reporting tools.

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The Problem-Oriented Medical Record (POMR)



Standards are not new!

- Dr. Larry Weed developed the Problem-Oriented Medical Record (POMR), and an electronic version of it, more than 40 years ago
 - Not in evidence in any Canadian EMRs, and physician practices can't effectively create a POMR of the type that Weed developed and continues to promote;
 - A POMR links problem list data with lab and medication data
- In his most April 2011 book, *Medicine in Denial* - <http://www.thepermanentejournal.org/files/MedicineInDenial.pdf>, Weed states upfront:

"Essential to healthcare reform are two elements: standards for managing clinical information (analogous to accounting standards for managing financial information) and electronic tools designed to implement those standards."
- Terminology standards for the content of e-records were described by Dr. James Cimino – *Cimino's Desiderata* in 1989 and revised in 1998 - characteristics integral to the design of a controlled healthcare vocabulary <http://www.cs.man.ac.uk/~jeremy/HealthInf/RCSEd/terminology-desiderata.htm>

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Standards + advanced EMR functionality = clinical value

- As health care costs continue to mount, there's an urgent need to capture data in a structured way to support clinical decision-making.
- We then need intelligent systems to integrate this data in a holistic way, so that the interdependent relationships of items on the problem list are recognized and considered when determining the true nature of the patient's problems and formulating treatment plans.
- This requires EMRs capable of intelligent integration of problems with lab, medication and other relevant record data as well as with online knowledge resources.
- A critical mass of EMR deployment + more tech savvy physicians + increasing "virtual" care via mobile devices & apps mean that further time and effort expended on implementing "basic" EMRs offers limited value.

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HI Standards – “Call to action”

- Detailed discussion document and recommendations developed for the CMA in early 2013
- Not yet available publicly but has been distributed to various organizations and physician groups for their input and suggestions; looking for general release in 2014
- Article based on foundational and educational aspects of the paper published in **CMA Future Practice - Standards: A Call to Action (Nov. 2013)** *Marion Lyver, MD* <http://viewer.zmags.com/publication/1eb582ac#1eb582ac/1>
- Extract focused on the value proposition for standards and suggested high priority standards prepared for possible publication in 2014

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e-Practice work flows

At a high level, it is useful to look at a physician’s e-Practice environment (office/clinic) in terms of common data creation, use and disclosure activities/processes that are carried out:

- **What we do** – clinical assessments
- **What we document** – the patient’s electronic record, especially Problems (health concerns), allergies, Medications, Lab test results, DI Reports, Measurements (vital signs are highest priority)
- **What we prescribe** – treatment e.g. CDM care; e-Prescribing (eRx)
- **Billing for services**
- **Communication and Information Sharing:**
 - What we receive
 - What we send out, fill out, print out, hand out
 - What we share – targeted e.g. transfers of care, hand-off/communications, or more broadly shared e.g. cumulative patient profile (health profile or health summary record)
- **What we analyze in order to better understand our patients problems and provide more effective care** - practice analytics data; population health studies; research
- **What we analyze in order to practice in a more efficient and productive fashion** – workflows; business processes e.g. data on appointment scheduling, follow-ups, preventive screening, e-encounters (virtual by email, portals, PHRs or other electronic routes), etc.

HI Standards – Call to action (cont’d)

- Provides an approach to looking at the key areas of clinical (office-based) physician practice (e-Practice work flows)
- Identifies “pain points” in those key areas of practice that require advanced use of an EMR
- Maps e-Practice pain points and workflows to HI Standards “enablers”
- Provides recommendations on high priority standards that can allow physicians to move forward with advanced use of EMRs
- Supports vendor efforts to implement standards and advanced EMR functionality and promote such functionality if already in their systems but not currently used by their physician clients

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E-Practice work flows mapped to HI standards

Workflow Area	Examples of Applicable HI Standards
Clinical assessments	Clinical information models e.g. archetypes; Detailed Clinical Models (DCMs)
Clinical record documentation	Data coding standards e.g. SNOMED CT (SCT), LOINC Data content standards e.g. CIHI PHC EMR Content Standards
Treatment	Clinical document standards e.g. HL7 CDA-based treatment plans; discharge summaries; synoptic reports Lab & DI standards Medication standards (TBD)
Communication & Information Sharing	Messaging standards Clinical document standards Lab & DI standards

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E-Practice work flows mapped to HI standards (cont'd)

Workflow Area	Examples of Applicable HI Standards
Efficiency & Productivity	Data, document & terminology standards to supporting efficiency e.g. PHC EMR Content Standards; CDA; SNOMED CT (SCT) Functional, process & data standards to support productivity e.g. - HL7/ISO EHR-System Functional Model (EHR-S FM) & Functional Profiles - ISO System of concepts to support continuity of care (Cont Sys); - SCT
Billing	ICD-9; ICD-8; move to SCT?
Overall usability of EMR systems	HL7/ISO EHR-S FM; ISO Cont Sys; Existing jurisdictional EMR specs Canadian EMR Adoption & Maturity Model
Moving & migrating patient records between systems	Data & terminology standards e.g. PHC EMR CS; CCD; Core Data Sets; SCT; LOINC

Next Steps

- Move on from basic EMRs
- Ensure that successful EMR implementation programs evolve to support the move to Levels 4 & 5 of the maturity model and evolve these levels, including:
 - Setting performance targets & rewards for meaningful use - physician practices achieving the highest EMR maturity levels and a high functioning POMR
 - Establishing/maintaining leadership and ongoing governance to sustain change and continue evolution of advanced EMR use.
- Deal with the standards "elephant in the room"!
 - Physicians need to understand why their EMRs aren't performing and better explain to vendors what they want their EMRs to do
 - At minimum, physicians need to increase their awareness, become informed & educated about standards – see CMA Future Practice article – Nov. 2013 - CMA Future Practice <http://viewer.zmags.com/publication/1eb582ac#1eb582ac/1>

Call to action on HI Standards – Recommended High Priorities

- **Canadian EMR Adoption & Maturity Model**
- **Standards for advanced EMR functionality** - national core spec? (leverage HL7/ISO EHR-S FM 10781.2 and jurisdictional specs to create)
- **Data content of primary care records, moving to specialist records**
- **Standards for clinical documents** – structure, content & sharing – leverages the HL7 CDA standard e.g. synoptic reporting (CCO, cancer surgery); Infoway pan-Canadian CDA (header) standard initiative; terminology standards (SCT as the national standard)
- **National standard for representing medication data including prescribed meds** – TBD with Infoway, physician, pharma, Health Canada collaboration
- **Standards that support practice analytics** to achieve enhance provider effectiveness and productivity – includes all of those mentioned in the previous tables


Next Steps (cont'd)

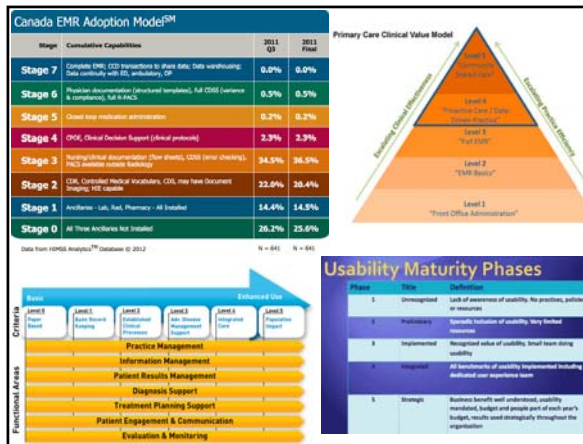
- CMA and/or provincial medical associations and/or jurisdictional EMR or physician eHealth programs take a leadership role on standards to:
 - Engage physician experts (emerging, new, existing), medical informatics experts (physicians & non-physicians) & related associations, along with vendor community.
 - Align physician needs for advanced EMR use with EMR functionality and standards - work flow mapping to show the value proposition.
 - Map the CMA e-practice standards model to the Canadian EMR Adoption & Maturity model.
 - Revise/update the maturity model as needed.
 - Review/confirm/revise - high priority standards (as per CMA standards paper recommendations).
 - Evolve the model going forward.
 - Determine what vendors need to know/do to address physician "pain points" in their work flows.
 - Determine how much physicians need to know about standards to get what they want and need from their EMRs.
 - Assess/advise physicians on best educational opportunities regarding standards – basic to "Weed" level.

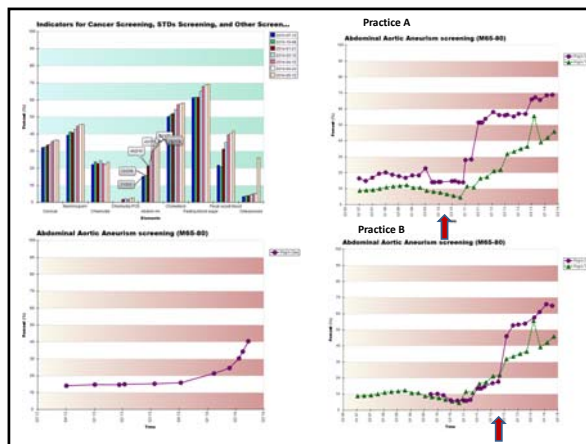
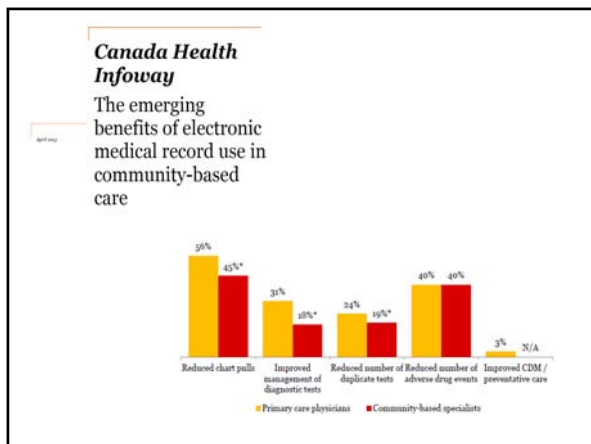
Standards and EMRs in Primary Care



W.L. Clifford, MD, MScF, FCFP
June 2nd, 2014


**Patient-Centred
Primary Care in Canada:**
BRING IT ON HOME
 "Care is coordinated, continuous and comprehensive with patients having access to an interdisciplinary team"





COCHRANE SUMMARIES

Trusted evidence. Informed decisions. Better health.

Screening for abdominal aortic aneurysm

Garford PA, Leng GC, Thomas J. Published Online: 16 March 2011

Advanced Report Builder

Medical Report

Report Name: **SCREENING FOR ABDOMINAL ANEURYSM**

Description: Patients who have not had screening done

PREVENTION

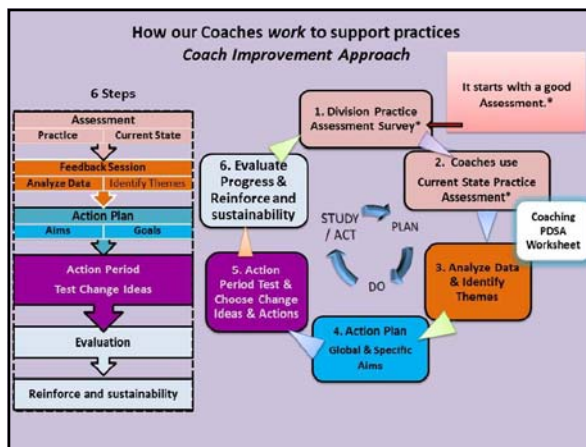
Interventions: Exercises, Counseling, Medication, Surgery

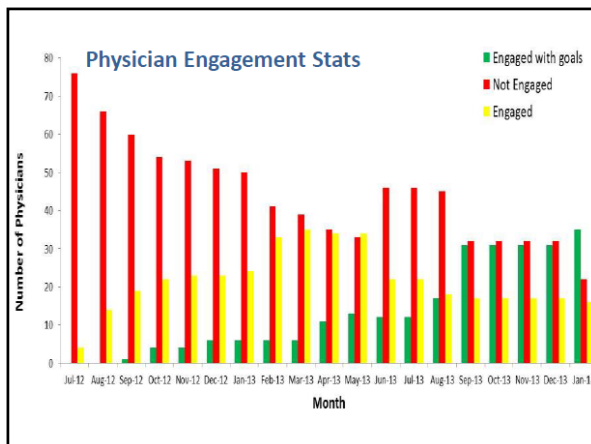
Comparison: Active D, Placebo

Patient Data: Health Conditions, Medications, Imaging

Patient Characteristics: Age Range: 65 to 75, Sex: M

Office Details: Provider: MEYER, A, Facility Code, Service Center





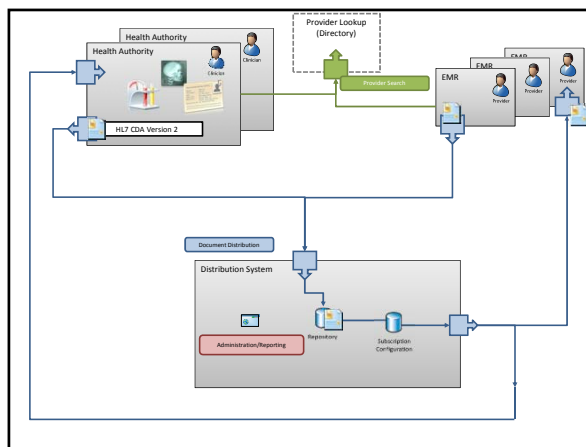
British Columbia CDA Implementation Guide
Version 1.0

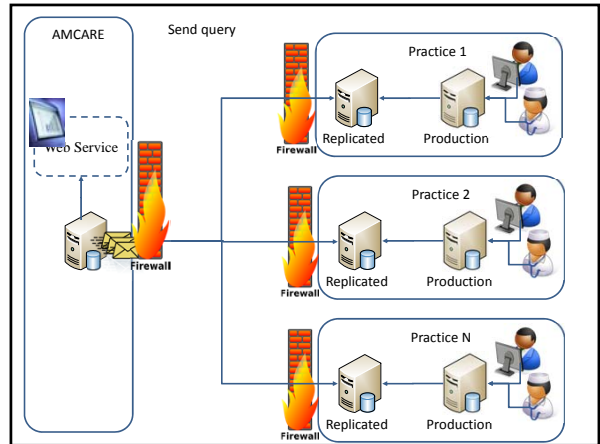
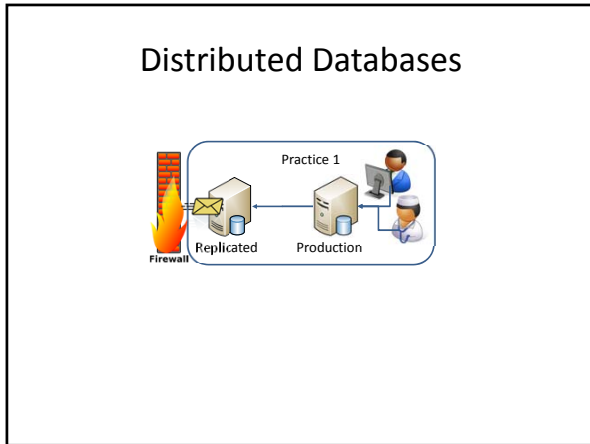
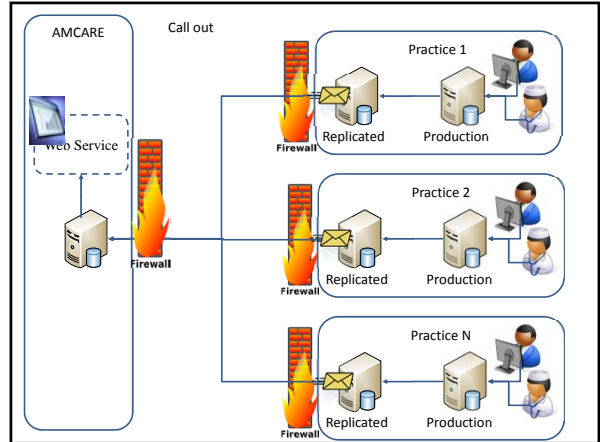
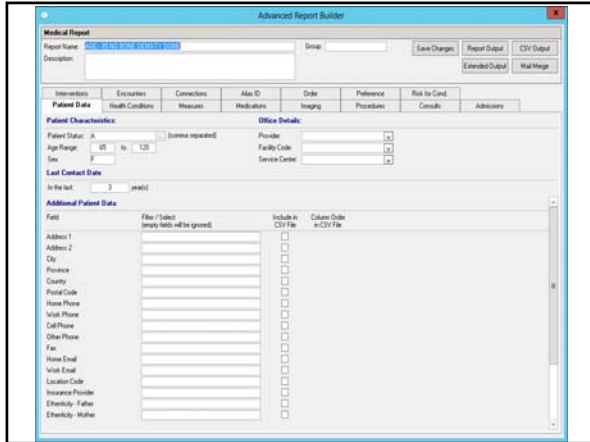
Creation Date: September 23, 2011
Author: eHR Integration Team
Last updated: July 7, 2013

Vocabulary / reference sets

Pan-Canadian Primary Health Care Electronic Medical Record Content Standard, Version 3.0

- Health conditions, adverse reactions, vaccinations
- Living arrangements, socioeconomic status, ethnicity
- Measures e.g. PHQ9, GAD7, number of tender joints, smoking history





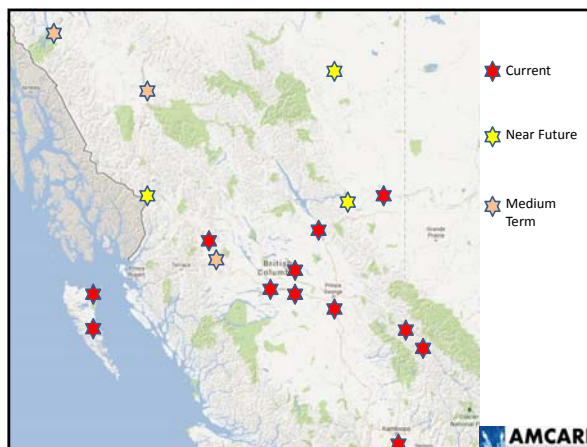
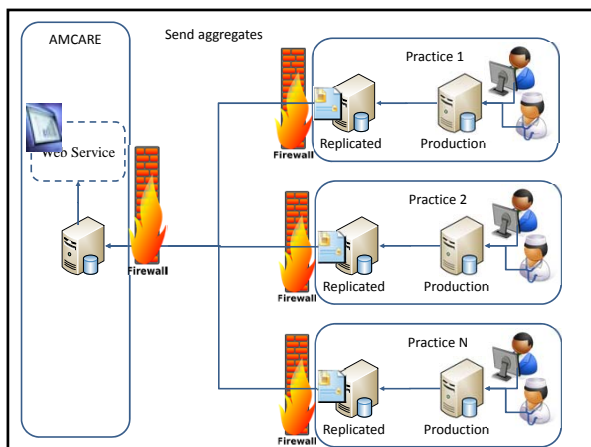
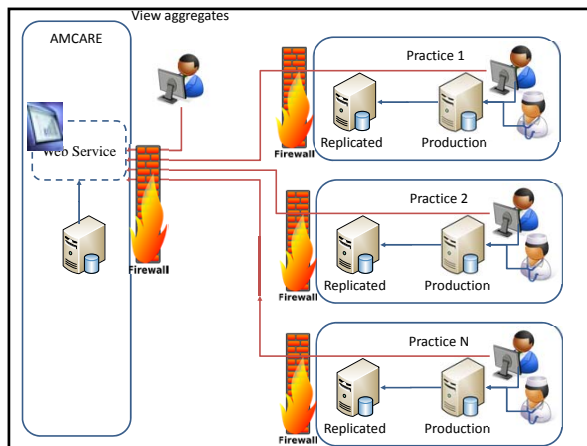
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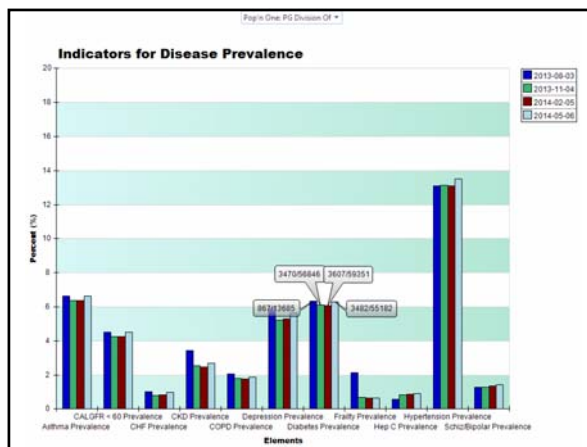
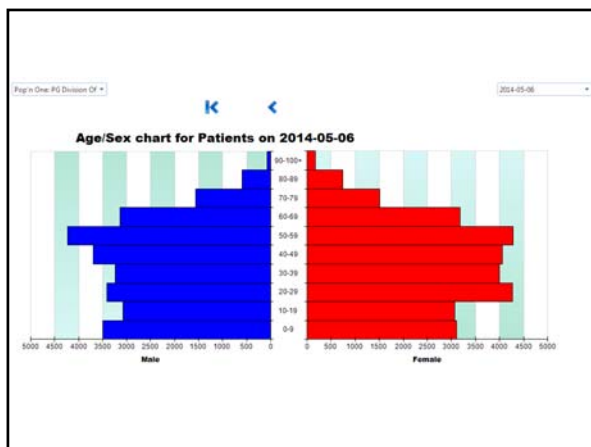
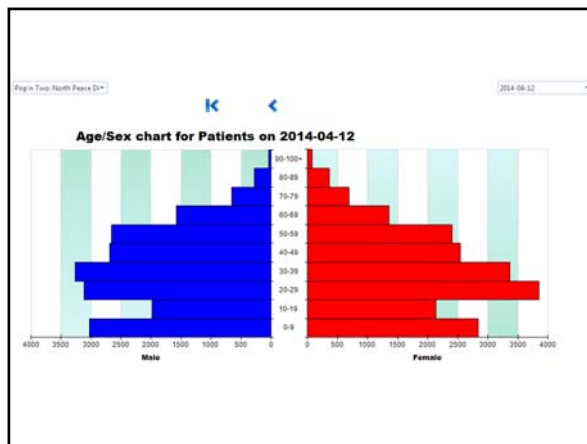
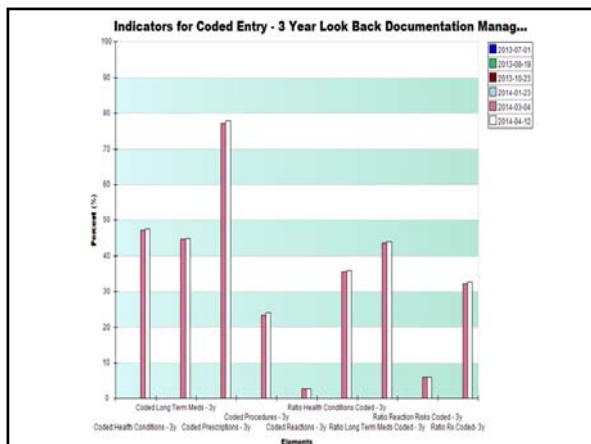
As Of Date: 2013.01.29 Patients Seen in Last 3 years For Provider(s): ALL PROVIDERS

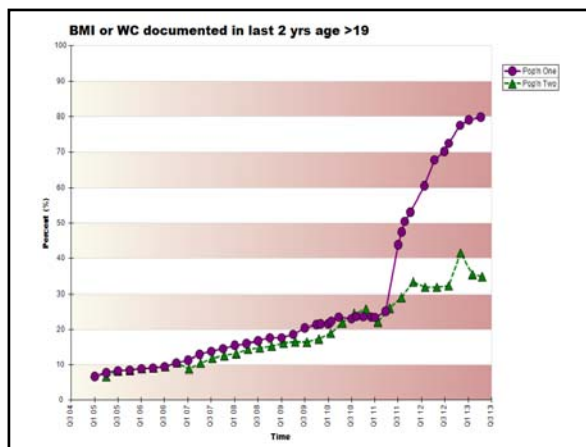
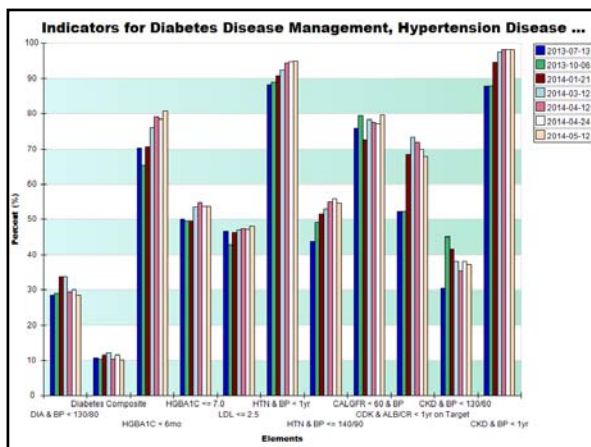
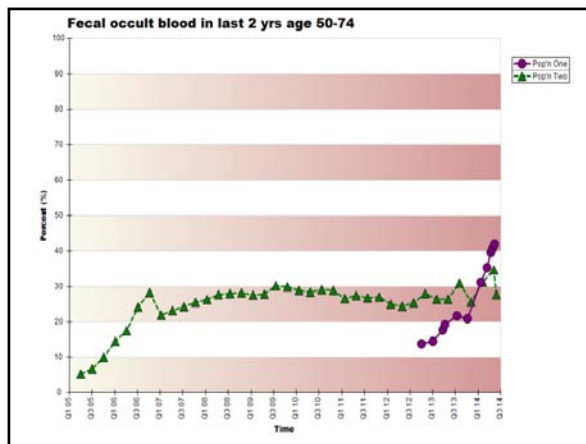
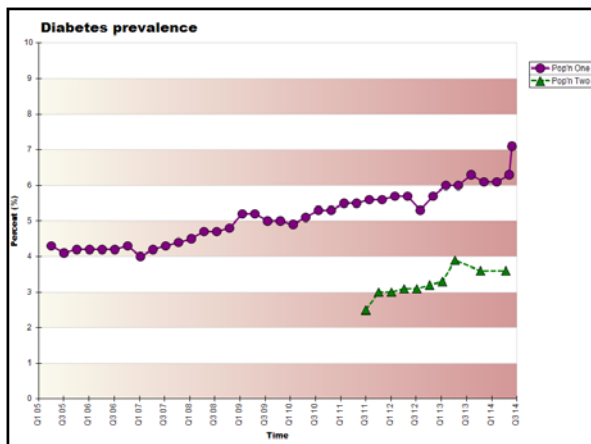
Contacts / PI	MALE			FEMALE		
	No. of Contacts	No. of Patients	AGE	No. of Patients	No. of Contacts	Contacts / PI
2.50	5	2	0-9	2	1	0.50
2.67	8	3	10-19	3	2	0.67
2.33	7	3	20-29	1	4	4.00
0.33	1	3	30-39	4	11	2.75
2.00	12	6	40-49	3	4	1.33
1.25	5	4	50-59	2	0	0.00
3.00	30	10	60-69	6	12	2.00
1.80	9	5	70-79	2	5	2.50
0.00	0	0	80-89	2	11	5.50
0.00	0	0	90-100+	0	0	0.00
2.14	77	36	TOTALS	25	60	2.00
			UNKNOWN AGE OR SEX:	1		
			TOTAL PATIENTS:	64		

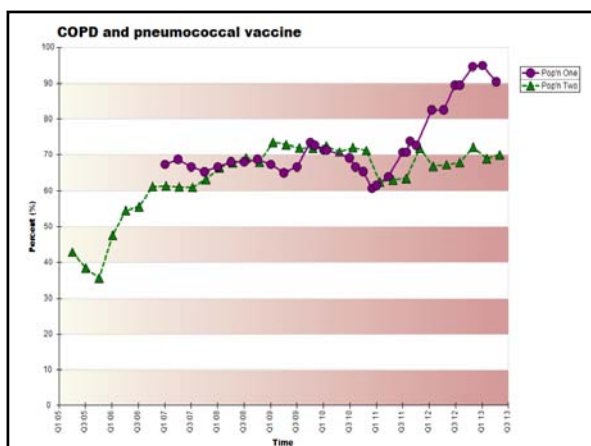
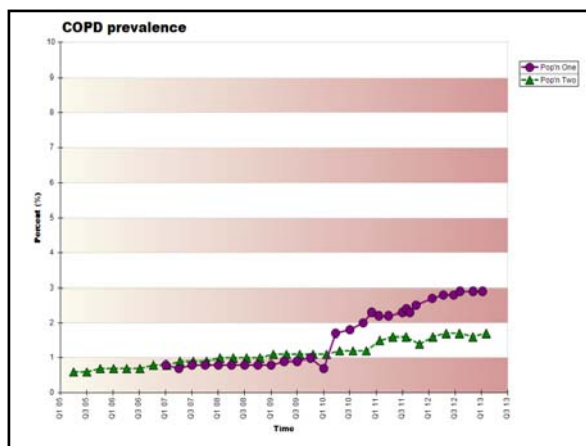
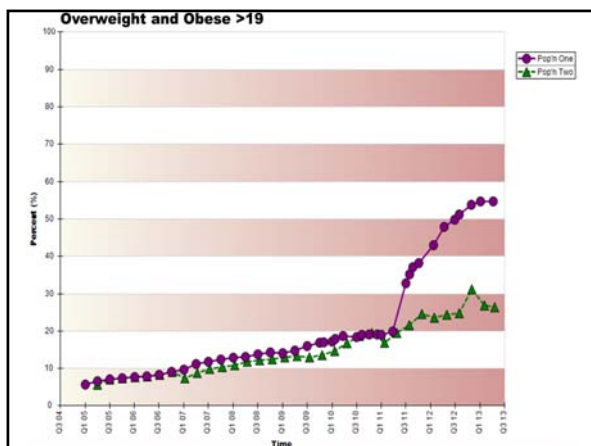
SECTION	ITEM	PERFORMED/ PRESENT	ELIGIBLE POPULATION
Prevention	Current Tobacco use age 12-19	11	51
Prevention	Current Tobacco use age >19	0	3
Prevention	Tobacco use documented in last 2 yrs age 12-19	1	51
Prevention	Overweight or Obese age 12-19	0	3
Prevention	Tatooal Obesity age >19	4	51
Prevention	BMi or WC documented in last 2 yrs age 12-19	0	3
Prevention	BMi or WC documented in last 2 yrs age >19	8	51
Prevention	Physical inactivity age 12-19	0	3
Prevention	Physical inactivity age >19	0	51
Prevention	Activity documentation in last 2 yrs age 12-19	0	3
Prevention	Activity documentation in last 2 yrs age >19	0	51
Prevention	Pneumococcal Vaccination age 65+	9	15
Prevention	Influenza Vaccination age 65+	0	15
Screening	Cervical Screening ages 19-70	0	17
Screening	Screening Mammogram ages 50-70	0	8
Screening	Cholesterol Screened in last 12 months ages 18-34	0	7

Aggregates












Summary

- Ready (“prepare to do something”)
- Remind (“cockpits”)
- Reflect (“dashboards” and “scorecards”)
- Reinforce

Governance – CoCustodial EMR Towards The Maturity Model

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Founding Principles

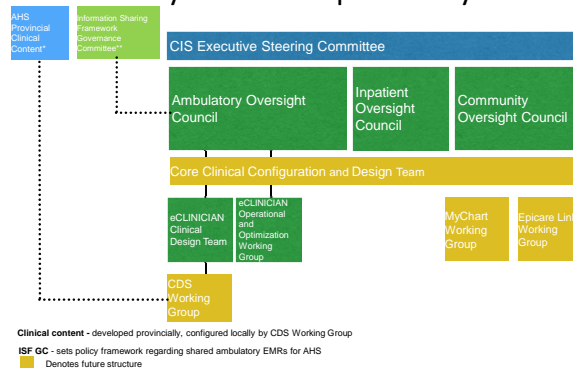
- **Patient care guides** the disclosure and use of EMR information, **at all times adhering to the HIA.**
- EMR information will be respected as the product of the **trusted relationship between a patient and a clinician**, ensuring the clinician's disclosure judgements are respected.
- Information will also enable **Health System Use for Quality Improvement and Health Research**, a key motivator for electronic records.
- EMR information will be **managed with due diligence** and attention, recognizing the potential harm that can arise from misuse.

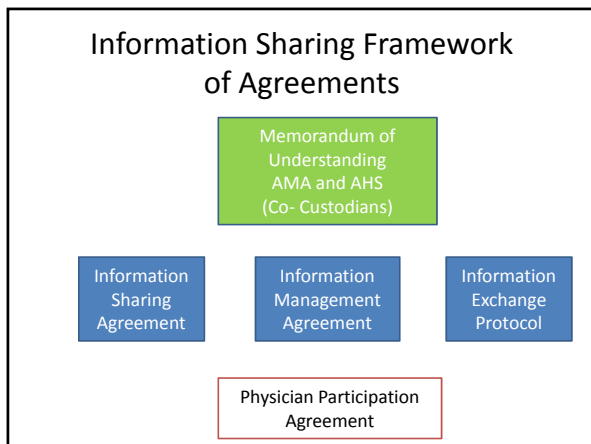
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The Key Question in an Advanced Shared EMR

- **ONE PATIENT – ONE RECORD**
- How do we share health information across custodial boundaries in a manner that respects patient privacy rights and allows custodians to meet their professional, legal and ethical obligations?

Clinical Information System “Ecosystem of Responsibility”





Information Management Agreement

- Requirement by the College of Physicians and Surgeons for any physician engaged in an EMR
- Defines the duties and responsibilities of the Information Manager (AHS) related to the services of maintaining an EMR, and supporting its Users.
- Requires regular reporting to the Governance Committee.

Information Sharing Agreement

- Lays out the terms of the agreement between the active EMR custodians (Physicians, Alberta Health Services, Covenant Health) while recognizing the role of other custodians, including the Minister of Health
- Establishes the need for a Governance Committee responsible for the adherence to regulated practices of “access, use, and disclosure” of information in the shared EMR

Information Exchange Protocol

- Defines the terms by which information will be accessed, used, and disclosed by Custodians and their Affiliates, using the shared EMR.

Physician Participation Agreement

- These rules bind all EMR Custodians and EMR Affiliates utilizing the EMR System. Custodians who choose not to sign the Information Sharing Agreement or other appropriate legal agreements may not access, use or disclose EMR Information in the EMR System.


Governance - Summary

- “One Patient – One Record”
- Foundation of Continuity of Care
- Requires assurance that all Custodians understand and adhere to a Sharing Agreement
- Governs the role and activities of the Information Manager

Audit

- A financial, clinical or other formal or systematic examination or review of a program, portion of a program or activity.
- Currently directed at appropriate use of the EMR with attention to the ‘same name’ access of information that may be inappropriate under the terms of the HIA.

Questions

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- Where do physicians believe they are in terms of the EMR maturity model levels? Does the model offer value?
 - How much do physicians need to know and care about HI standards, in particular, data content and data coding standards?
 - What standards do physicians see as enhancing the value of their EMRs?
 - What do EMR vendors need to know and pursue to offer the most value for their clients – both in terms of functionality and standards?
 - Where does the leadership/governance come from to move forward with advanced EMR use?

Resources

- **Canadian EMR Adoption & Maturity Model: A Multi-Jurisdiction Collaborative & Common Model White Paper (pdf)**
<https://members.coachorg.com/Members/Shared%20Documents/Canadian%20EMR%20Adoption%20and%20Maturity%20Model%20White%20Paper.aspx>
- **HI Standards – Call to Action** (CMA commissioned draft paper), 2013 – contact mlyver@live.ca
- **CMA Future Practice - Standards: A Call to Action (Nov. 2013)** *Marion Lyver, MD*
<http://viewer.zmags.com/publication/1eb582ac#1eb582ac/1>
- **Unlocking the Patient Care Benefits: Maturing EMR Adoption in Primary Care – HIMSS 2014 – Neil Gardner for COACH**
<http://www.coachorg.com/en/resourcecentre/resources/Presentations/MicrosoftPowerPoint-114-NeilGardnerPresentation.pdf>
- **HIMSS EMR Adoption Model for Physician Offices**
<http://www.himssanalytics.org/docs/AmbulatoryEMRAMStages13April09.pdf>